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JOHN W. FINCH, DIRECTOR

INFORMATION CIRCULAR

MILESTONES IN MINE-SAFETY LEGISLATION

BY

L. C. ILSLEY

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MILESTONES IN MINE-SAFETY LEGISLATION[1]

By L. C. Ilsley[2]

Coal mining as a commercial industry has an historical background of several centuries. The social status of those who mine the coal as compared with that of those who own it has changed many times during this long period. Today labor probably takes on more dignity than in any other period of the world's history. This position has been attained step by step, often through legislation. Especially has this been the case in the coal-mining industry.

Comparatively speaking, coal mining may be classed as one of the hazardous industries. The first known suggestion that safety should be considered in mining is found in Agricola's[3] treatise on mining and metallurgy written during the sixteenth century. On page 214 is found the following statement:

> It remains for me to speak of the ailments and accidents of mines, and of the methods by which they can guard against these, for we should always devote more care to maintaining our health, that we may freely perform our bodily functions, than to making profits.

In this brief, terse statement is enunciated a principle that has a tremendous bearing on all matters of accident prevention. That principle is safety first, profits second, and unwillingness to accept this principle is what makes mandatory safety laws and regulations necessary.

A little farther on Agricola becomes more specific in his remarks, as follows:

> Further, sometimes workmen slipping from ladders into the shafts break their arms, legs, or necks, or fall into the sumps and are drowned; often, indeed, the negligence of the foreman is to blame, for it is his special work both to fix the ladder so firmly to the timbers that they cannot break away, and to cover so securely with planks the sumps at the bottom of the shafts, that the planks cannot be moved nor the men fall into the water; wherefor the foreman must carefully execute his own work. Moreover he must not set the entrance of the shaft-house toward the north wind, lest in winter the ladders freeze with cold, for when this happens the man's hands become stiff and slippery with cold, and cannot perform their office of holding. The man, too, must be careful that even if none of these things happen, they do not fall through their own carelessness.

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[1] The Bureau of Mines will welcome reprinting of this paper provided the following footnote acknowledgment is used: "Reprinted from U.S. Bureau of Mines Information Circular 6904."

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[3] Agricola, Georgius, De re metallica, 1556: Translated by Herbert C. and Lou H. Hoover, London, 1912, 640 pp.

In the foregoing paragraph there are set forth remarkable safety principles. First, there is the recognition that accidents take place; second, the fact is stated that the foreman has a duty to perform to take precautionary measures to prevent accidents. If the foreman does not do this he is "negligent." A mine should be so planned as to minimize the liability of accidents. Finally, the men themselves should be careful and should themselves help to safeguard their lives. Some of the foremen in this advanced twentieth century could profit by studying the safety principles set forth in 1550.

Condition in British Mines Before the Day of Safety Codes

At the time Agricola wrote his mining treatise, Great Britain was entering a period of prosperity. Great strides were being made in literature and science. But this era of rapid advancement did not include miners for whom there was a long struggle ahead before they were to work under the more or less ideal condition pictured by Agricola.

The legal enactments on mining promulgated during the seventeenth and eighteenth centuries give a picture of the lowly state of mine workers in those times. An act of the Scottish Parliament in 1606 made the Scottish colliers bondmen for life. This act provided that all colliers, coal bearers, and salters who might leave their masters without written consent were to be held as thieves. In 1661 another Scottish act extended the original act to include other underground workmen. This condition of bondage continued in Scottish mines until 1775, when, not as a humanitarian act but in order to relieve labor shortage, the following act was passed:

> Whereas, By the statute laws of Scotland, as explained by the judges of the courts of law there, many colliers and coal-bearers and salters are in a state of slavery and bondage, bound to the collieries, or salt works where they work, for life, and are transferable with the collieries and salt works; and
>
> Whereas, Persons are discouraged from learning the art or business of colliers, or coal bearers, by means whereof there is not a sufficient number of colliers, or coal bearers, in Scotland for working the quantity of coal necessarily wanted; and many are not sufficiently wrought, to the great loss of the owners and disadvantage of the public;
>
> Be It Therefore Enacted, that on and after the first of July, 1775, any person who begins work as a collier in Scotland shall be deemed free, and shall enjoy all the privileges, rights and immunities as the rest of His Majesty's subjects.

In a book entitled "History of Coal Miners of the United States," Andrew Roy[4] the first mine inspector of Ohio tells of conditions in British mines at the time the so-called Emancipation Act of 1775 was passed, and also shows that these conditions continued during the first half of the nineteenth century. Several paragraphs are quoted, as follows:

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[4] Roy, Andrew, History of Coal Miners in the U. S.: 1907, pp. 19-22.

The act of 1775, instead of being hailed as a blessing was looked upon with suspicion by the colliers. Sir Walter Scott informs us that so far from prizing the blessings of liberty, the colliers regarded the interest taken in their emancipation as a mere device of their masters to get "rid of the harigold money which was paid them when a female child was born, and made an addition to the live stock of their master's prosperity." But they soon began to appreciate the blessings of freedom; they gradually acquired more prudent habits, and not only became reliable workmen, but did more work in a day than they were accustomed to do in two, in their bondage.

The miners began to gather around the pit as early as three o'clock in the morning, but were not allowed to go down until four, the first on the ground having the right of descent. The corves held four to six people. The father, his sons and daughters generally descended together; the youngsters sitting in the bottom of the corve, the father standing erect, with one leg outside, and one arm guiding the corve, to keep it from striking the sides of the pit. The younger and bolder men who had no charge caught the rope, as the cage descended below the platform, and clung to it until the bottom was reached. Sometimes three or four men would descend in this manner one above the other. Before going down they stuck their picks on their left arm. When a miner carried a pick in any other manner it was proof that he was not a trained pitman.

In hauling, two women were usually employed - one behind and the other in front; the forward one was hitched to the mine car, with a belt around her waist and a chain passed between her legs. In many parts of England the women dressed like boys.

When the commissioners appointed by Parliament in 1842 to inquire into the operation and results of female labor in coal mines made their report, they presented a picture of deadly physical oppression and systematic slavery which no one unacquainted with the facts would credit. The women worked twelve to fourteen hours a day in the damp and unwholesome air of mines, crawling on all fours, in the low veins, in dragging the loaded cars along roadways, which in many places were covered with water a foot deep.

In Scotland women were not only employed in hauling the coal along such roadways, but at many mines they carried the coal up the shaft on their backs, through a long winding stairway, the load being carried in wicker cribs fitted to the backs of the women and held in place by leather straps passing around their foreheads. Mr. Robert Bald, the eminent coal viewer of Scotland, who knew them well, stated that their day's work was equal to carrying a hundred weight from the sea level to the top of Ben Lomond; and Hugh Miller, the celebrated geologist, who in 1824 worked at his trade as mason at one of the mining villages near Edinburgh, states in his autobiography that he often saw the poor women coal-bearers toiling under their loads, and crying like children along the upper rounds of the wooden stair that traversed the shaft.

The routine work of miners was bad enough without being exposed to such major hazards as falling rock, drowning by incoming water, and mine explosions. The one hazard above all others that endangered the life of coal miners was the explosion of methane, which gas commonly occurred in many of the deeper coal mines in great quantities. For many years this gas was not known by its right name or constituents, and many superstitious ideas grew up in regard to the sudden and what appeared mysterious explosions when it was ignited by coming in contact with the open flame of a miner's light.

During the period 1705 and 1708 there were two mine disasters in the deep coal pits in the North of England. In the first over 30 lives were lost. Nearly 200 years afterward the following burial records were abstracted and published in a British paper:

> These were slain in a coal-pit in the Stony Flatt, which did fire.
>
> October 4: - Cuthbert Richinson, Michael Richinson, Ralph Richinson, brothers; William Robinson; John Liddell; John Broune, Clement Broune, William Browne, brothers; Robert Broune, son to Clement Broune.
>
> Blown Up the Pit
>
> Jonn, son of John Broune; Adam Thompson; Joseph Jackson; Abigail Jackson, daughter to Joseph Jackson; John Hastings, overman; Michael Walker, his servant.
>
> October 5: - Leonard Jordan, John Green, John Distans; Richard Fletcher, John Hall, William Maine; Thomas Ridell; Thomas Huggison.
>
> October 6: - Bryon Thornton; Michael Thompson, Robert Cooke; Matthew Hastings, overman, son to John Hastings.
>
> October 7: - John Sayers.
>
> October 10: - Edward Jordan; John Todd.
>
> October 13: - Thomas Ridsdall.

The second explosion was reported to the Royal Society in considerable detail. In this catastrophe 69 miners lost their lives. The shaft was 342 feet deep, and the force of the explosion was so great that three of the victims were blown up the shaft.

The records of these two explosions, which occurred more than 200 years ago, show that even at that early date the deeper coal layers were being mined, that a large number of workmen was employed in a single mine, and that mine gas was being ignited by open-flame lamps, the only source of illumination. The gas explosion undoubtedly stirred up coal-dust clouds, which in turn were ignited and extended the conflagration throughout the mine workings and accounted for the violence reported.

Conditions continued thus for several years, with coal being mined, risks being taken, and disasters occurring periodically. Wm. Clifford[5], a mining

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[5] Clifford, Wm., First Safety Lamp: Colliery Engineer and Metal Miner, vol. 17, 1897, p. 223.

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engineer, in a paper read before the North of England Institute of Mining Engineers describes some of the early practices of detecting and eliminating dangerous quantities of mine gas in the days preceding the invention of the flame safety lamp, as follows:

> Fire damp became a serious danger and an obstacle to coal mining in the very infancy of the industry, and various methods were adopted to detect its presence and guard against its effects; some of these means were of a crude, and to us, ludicrous nature.
>
> The examination of mines (such as it was) before the miners entered was practiced in the midland counties of England as early as the reign of James II, and it is said that the usual procedure in making an examination was by lowering a dog down the shaft in a basket. When he entered the fire damp he would begin to howl. He was then withdrawn, and a bush fastened to the end of a rope was run rapidly up and down the shaft. A deputy or provost is still called a "doggy" in Staffordshire.
>
> The practice of firing the gas before the miners entered the pit was first put into force at Mostyn Colliery, North Wales, about the year 1650. The mode of operation was for a man who made it his special business to descend the shaft some time before the hour for commencing work. This man, clad in wet sackcloth, crawled upon his belly into the workings, and by raising lighted candles on the end of a long stick like a fishing pole up to the roof he would light the gas and then lie close on the floor until the flame of the explosion had passed over him. Hence the origin of the term "fireman."
>
> At the time when Sir James Lowther came into the possession of Whitehaven Collieries, Cumberland, England, fire damp had become a very formidable and fatal enemy of the miner. Sir James, who took the liveliest interest in all matters pertaining to coal pits, sent a youth named Carlisle Spedding to Newcastle-on-Tyne to learn what he could there of the art of coal mining, previous to his taking charge of the Whitehaven Collieries. Spedding worked in the Tyneside pits as a hewer under the fictitious name of "Dan," and it was only after being burned with fire damp that his real name and objects were discovered. He returned to Whitehaven as soon as he recovered from his burns. He originated "coursing the air," and, what more concerns us, about 1750 invented the steel mill. In 1755 he was killed by an explosion of gas in Whitehaven Collieries.
>
> In early days there were employed in mines a class of persons called "candle watchers;" and men became very expert in detecting fire damp with an open light and judging generally of its constituent character in this crude way - the writer well remembers his first lesson in this practice from an old miner.

Early Safety Efforts

The steel mill invented by Spedding was a thin steel disk so geared that it could be rotated rapidly by a hand crank. The light was produced by the shower of sparks that resulted from holding a piece of flint against the rim of the steel disk.

This means of lighting, although used to a considerable extent for more than 50 years, gave such a poor light that in many instances the miners risked their lives by using open lights. The steel mill was undoubtedly safer than the open light, but was said to have caused a number of mine explosions, and it is quite possible that it may have caused the explosion in which Spedding lost his life. Thus, the problem of safe underground illumination was not yet solved satisfactorily, and disasters continued with great regularity throughout the eighteenth century and with no cessation during the early part of the next century.

Public Interest and the Development of the Flame Safety Lamp

Astounded by these all too frequent disasters, which culminated in the Felling Colliery disaster in which 92 miners lost their lives, certain philanthropic citizens formed themselves into a "Society in Sunderland for Preventing Accidents in Coal Mines." Dr. Wm. Reid Clanny[6], inventor of the Clanny safety lamp, was a member of this society and has recorded in the Philosophical Transactions for 1813 conditions immediately previous to this time, as follows:

> It will be unnecessary to detail the phenomena of an explosion of inflammable air, as they are already sufficiently known; but I hope it will not be unacceptable to the society to record a few of the more considerable explosions which have occurred in the course of the last seven years in this district alone, independently of those which have taken place in other parts of the kingdom within the same time. In the summer of 1805 an explosion happened at Hepburn Colliery by which 32 pitmen were killed, who left wives and children in a destitute state to the number of 105. About the same time a colliery at Oxclose blew up, by which, I understand, 38 men perished, leaving 18 widows and 70 children unprovided for.
>
> Soon after this melancholy catastrophe 10 men perished at Killingworth by an explosion. And about the same time 7 men were instantly killed and several severely wounded by an explosion at Fenton Park colliery. On the 25th day of May, 1812, the colliery at Felling exploded, by which 92 persons were instantly destroyed, leaving 41 widows and 133 children to the protection of the public. And, upon the 10th of October last, the Harrington mill pit exploded, by which 23 people were killed and many others severely wounded and scorched. Thus, in the short space of seven years, upwards of 200 pitmen were deprived, most suddenly, of their mortal existence, besides a great many wounded; and upwards of 300 women and children were left in a state of greatest poverty.

During the summer of 1815 the Society in Sunderland procured the services of Sir Humphrey Davy to develop a safer means of lighting the mines, since the open light coming in contact with the mine gas was the common cause of these disasters. Davy solved this problem by inventing the Davy safety lamp, which was brought out as early as January 1816. The Davy lamp was adopted quite widely and was hailed everywhere as a remarkable safety device.

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[6] Clanny, Wm. Reid, On the Means Of Procuring a Steady Light In Coal Mines Without the Danger Of Explosion: Phil. Trans. Roy. Soc., London, 1813, pp. 200-204.

Safety Lamps Without Law Enforcement

The fact that a safety device had been developed did not insure its proper or consistent use. The flame safety lamp was not used universally in the years immediately following its introduction. Even in those mines where it was used there were times when the open flame was preferred because it gave a better light. In the meantime explosions continued. According to statistics compiled by Robert Y. Galloway, 43 mine explosions occurred in British mines, causing the death of 639 persons between June 30, 1817, and November 19, 1835. These disasters were so frequent and took such a great toll of life, with its consequent bereavement and suffering, that public sentiment for the miners became widespread. At the time the Sunderland Society was organized it was not customary to hold an inquest as to the cause of a miner's death. The society called attention to this neglect, and from that time inquests generally were held.

British Parliament Investigates Cause of Accidents

The British Parliament appointed a committee in 1829 to study the cause of coal-mine accidents. In 1833 a Factory Act was passed. One of the commissioners appointed under this act visited a coal mine in his district. When he submitted his report he made the following comment:

> I cannot much err in coming to the conclusion, both from what I saw and the evidence of witnesses under oath, that it must appear to every impartial judge of the occupation that the hardest labor in the worst room, in the worst-conducted factory, is less hard, less cruel, and less demoralizing than in that of the best of coal mines.

In 1838 there was an explosion at St. Hilda Colliery in which 52 lives were lost. A committee of prominent men was organized to inquire into the cause of the explosion. This committee labored for 3 years, studying not only this but other disasters, and made a report in 1842 which contained recommendations for better regulation and ventilation of mines and urged legislation to prohibit the employment of women and children.

Lord Ashley, one of the first to take up the cause of the miners in Parliament, was instrumental in 1840 in having a royal commission appointed to inquire into the operation and result of female labor in coal mines; also as to the employment of children, the number of hours they worked, and the effect on their health. This commission was on duty 2 years and made a careful report, which was used in obtaining ameliorating acts during the next few years.

In 1842 Lord Ashley introduced a bill to prohibit the employment underground of women and boys under 13 years of age, to provide for the inspection of mines by the Government, and to abolish the prevailing system of apprenticing boys. This bill was attacked bitterly by the coal owners. One large owner claimed it would result in the most important coal mines being closed and attributed the whole movement to "hypocritical humanity." The bill as finally passed did not include the section for mine inspection, but female labor was abolished and boys were prohibited from working in mines until they were 10 years of age.

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During the period 1842 to 1850 other disasters occurred, and attempts were made to enact legislation for mine inspection, which were withdrawn in favor of a commission that took evidence pro and con in regard to the necessity for such an inspection act.

First British Coal-Mining Safety Code

The evidence obtained by the commission was instrumental in creating a sentiment sufficient to pass the act of 1850. This first British mining law is a real milestone in "safety" legislation. Undoubtedly men had been mining coal for 600 years. It is not surprising that it was difficult to break down century-old traditions, and one can well understand why the only way to get such a law enacted was to make it cover a trial period of 5 years.

The law called for two inspectors, and it thus initiated that necessary safety precaution, which from that day to this has been required in British coal mines.

Second British Coal-Mining Safety Code

Inspection under the 1850 act must have proved to the industry that such work was necessary and that the coal-mining industry could continue to exist under such safeguards as were being enforced, since in the subsequent enactment no time limit was set. This act undoubtedly was a compromise between what the owners were willing to concede and what the mine workers deemed necessary.

First Major Amendment to British Safety Code

In 1862 a shaft accident occurred in the Hartley mine which caused 205 miners to lose their lives. At the Hartley mine, like most British mines of that time, there was only one shaft opening. This opening being destroyed, the miners perished before it could be repaired. Because of public sentiment, Parliament amended the mining law to require that there be two separate openings to all mines. Owing to the depth of British mines, this entailed a very great outlay, and the operators maintained it would ruin their business. However, the new law was enacted and coal mining continued.

Other British Coal-Mining Acts

Many other changes were made in the British Coal-Mining Safety Code from time to time. One of the most notable was the act of 1911, which broadened and amplified earlier codes. This act has since been amended and amplified. In general it can be said that British mine safety laws are well-considered and ably enforced by a trained inspection personnel. Accidents experienced in Great Britain during recent years bear out the wisdom of such procedure.

LEGISLATION IN THE UNITED STATES

Early Mining Conditions

For the most part the early miners in the United States were natives of Great Britain who emigrated to this country, bringing the traditions of their trade across the sea. Having progressed far up the scale from their once lowly condition,

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they began their mining work in America on a much higher level of independence than that of the early miners in Great Britain.

Mining of coal in the United States probably was not carried on to any considerable extent until about the time of the Civil War. Coal was advertised for sale in the Virginia Gazette in 1776, and Virginia coal was used extensively during the Civil War. Anthracite mines probably were opened previous to 1784. There is plenty of evidence that both bituminous and anthracite mining had their beginning in the United States during the last third of the eighteenth century.

As mining progressed and mines became more extensive, mine disasters began to occur, and one sees a repetition of what has already been related in regard to loss of life in British mines. The first recorded mine disaster in United States mines was in 1839 at the Black Heath Mine, near Richmond Va., in which 40 men were killed. All told, there have been nearly 500 mine disasters in United States mines, in which over 11,000 men have perished.

First Mining Safety Code

The first Mining Safety Code in the United States was enacted in 1869. This code was not for an entire State but embraced only one County - namely, Schuylkill County - in the anthracite field of Pennsylvania. This code seems to have been made possible by more harmonious relations between the men and the coal mine operators in that county than in the rest of the anthracite field.

Code Covering Anthracite Mines

The worst disaster that ever occurred in the anthracite district was in 1869 at the Avondale mine, in which 179 men were killed. There was but one opening to this mine, and that was blocked by a fire in the shaft. The smoke from this fire caused the death of all the men in the mine. When the Pennsylvania legislature met in the following year a law that covered all mines in the anthracite field was quickly passed. This law called for six mine inspectors to conduct inspections in as many districts in the anthracite field and required that each mine employing more than 20 men have two openings. The Pennsylvania Bituminous Law was enacted in 1877.

Early Safety Codes of Other Mining States

Such a flood of sentiment was stirred up by the great loss of life in the Avondale disaster that several other States enacted laws within a short period, among them being the following: Colorado, Illinois, Indiana, Iowa, Kentucky, Maryland, Missouri, Ohio, Washington, West Virginia, and Wyoming.

Present Mine Safety Codes

At present 25 coal-mining States have enacted safety codes. Some of these codes apply to both metal mines and coal mines. In addition to these, 10 States have codes covering metal mines. Several States have codes covering quarries and tunnels, also.

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Federal Legislation

One of the most important pieces of mining legislation that has been passed in the United States was the act of May 16, 1910, establishing the Bureau of Mines. The Bureau's scope was greatly extended by amendments in 1913 and 1915. Since these amendments are the chief authority for the Bureau's activities in the interest of the betterment of mining conditions, they are quoted in full:

1913 - Act of February 25, 1913 (37 Stat. L., 681) - An Act to Amend an Act entitled "An Act to Establish in the Department of the Interior a Bureau of Mines," approved May sixteenth, nineteen hundred and ten.

(Sec. 1). That the Act to establish in the Department of the Interior a Bureau of Mines, approved May sixteenth, nineteen hundred and ten, be, and the same is hereby, amended to read as follows:

That there is hereby established in the Department of the Interior a bureau of mining, metallurgy, and mineral technology to be designated the Bureau of Mines, and there shall be a director of said office who shall be thoroughly equipped for the duties of said office by technical education and experience and who shall be appointed by the President, by and with the advice and consent of the Senate, and who shall receive a salary of six thousand dollars per annum; and there shall also be in the said bureau such experts and other employees, to be appointed by the Secretary of the Interior, as may be required to carry out the purpose of this Act in accordance with the appropriations made from time to time by Congress for such purposes.

(Sec. 2). That it shall be the province and duty of the Bureau of Mines, subject to the approval of the Secretary of the Interior, to conduct inquiries and scientific and technologic investigations concerning mining, and the preparation, treatment, and utilization of mineral substances with a view to improving health conditions and increasing safety, efficiency, economic development, and conserving resources through the prevention of waste in the mining, quarrying, metallurgical, and other mineral industries; to inquire into the economic conditions affecting these industries; to investigate explosives and peat; and on behalf of the government to investigate the mineral fuels and unfinished mineral products belonging to, or for the use of, the United States, with a view to their most efficient mining, preparation, treatment and use; and to disseminate information concerning these subjects in such manner as will best carry out the purpose of this Act.

(Sec. 3). That the director of said bureau shall prepare and publish, subject to the direction of the Secretary of the Interior, under the appropriations made from time to time by Congress, reports of inquiries and investigations, with appropriate recommendations of the bureau, concerning the nature, causes, and prevention of accidents, and the improvement of conditions, methods and equipment, with special reference to health, safety, and prevention of waste in mining, quarrying, metallurgical, and other mineral industries; the use of explosives and electricity, safety methods and appliances, and rescue and first-aid work in said industries; the causes and prevention of mine fires; and other subjects included under the provisions of this Act.

(Sec. 4). In conducting inquiries and investigations authorized by this Act neither the director nor any member of the Bureau of Mines shall have any personal or private interest in any mine or the products of any mine or private mineral property, or issue any report as to the valuation or management of any mine or other private mineral property: Provided, That nothing herein shall be construed as preventing the temporary employment by the Bureau of Mines, at a compensation not to exceed ten dollars per day, in a consulting capacity or in the investigation of special subjects, of any engineer or other expert whose principal professional practice is outside of such employment by said Bureau.

(Sec. 5). That for tests or investigations authorized by the Secretary of the Interior under the provisions of this Act, other than those performed for the Government of the United States or State governments within the United States a reasonable fee covering the necessary expenses shall be charged, according to a schedule prepared by the Director of the Bureau of Mines and approved by the Secretary of the Interior, who shall prescribe rules and regulations under which such tests and investigations may be made. All moneys received from such sources shall be paid into the Treasury to the credit of miscellaneous receipts.

(Sec. 6). That this Act shall take effect and be in force on and after its passage.

1915 - Act of March 3, 1915 (38 Stat. L., 959) - An Act to provide for the establishment and maintenance of mining experiment and mine safety stations for making investigations and disseminating information among employees in mining, quarrying, metallurgical, and other mineral industries, and for other purposes.

(Sec. 1). That the Secretary of the Interior is hereby authorized and directed to establish and maintain in the several important mining regions of the United States and the Territory of Alaska, as Congress may appropriate for the necessary employees and other expenses, under the Bureau of Mines and in accordance with the provision of the Act establishing said bureau, ten mining experiment stations and seven mine safety stations, movable or stationary, in addition to those already established, the province and duty of which shall be to make investigations and disseminate information with a view to improving conditions in the mining, quarrying, metallurgical, and other mineral industries, safeguarding life among employees, preventing unnecessary waste of resources, and otherwise contributing to the advancement of these industries: Provided, That not more than three mining experiment stations and mine safety stations hereinabove authorized shall be established in any one fiscal year under the appropriations made therefor.

(Sec. 2). That the Secretary of the Interior is hereby authorized to accept lands, buildings, or other contributions from the several States offering to cooperate in carrying out the purposes of this Act.

STATE COMPENSATION LAWS

Forty-four States - many of them mining States - have enacted workmen's compensation laws. Most of these laws were enacted between 1910 and 1920, and they are continually being amended, generally, however, in respect to increased compensation. Such laws have done much to reduce accidents in coal and metal mines.

Mine operators find that it pays in reduced cost of compensative insurance to enforce safety rules, to put on safety programs, to purchase accident-preventive equipment, and to employ a safety director who can properly coordinate and supervise such work.

Death benefits, permanent total disability, and temporary total disability usually are paid on the basis of a percentage of the earnings of the injured or in lump sums. The laws vary considerably in the several States, but in most States a poor record for a given year increases the cost of insurance for the following year; and in every State cost of accidents is so great that any plan to reduce their number is sure to interest the mine operator.